

AMENDMENTS**In the Claims****Current Claims Status**

1 1.(canceled)
 2 2.(canceled)
 3 3.(canceled)
 4 4.(canceled)
 5 5.(canceled)
 6 6.(canceled)

7 7.(currently amended) A method for using modified nucleotides to alter base incorporation
 8 fidelity comprising the step of adding a modified nucleotide including a molecular tag to a
 9 nucleotide polymerization medium comprising a nucleotide polymerizing agent, a primer, and a
 10 template, and a pyrophosphorolysis inhibitor selected from the group consisting of compounds of
 11 the following general formulas and mixtures or combinations thereof:

12	$Z-OPO_2O-Z'$	(a)
13	$Z-PO_2O-Z'$	(b)
14	$Z-OPO_2-Z'$	(c)
15	$Z-PO_2-Z'$	(d)
16	$Z-OPO_2-(OP(E'E')O)_n-PO_2O-Z'$	(e)
17	$Z-OPO_2-(OP(E'E')O)_n-PO_2-Z'$	(f)
18	$Z-PO_2-(OP(E'E')O)_n-PO_2O-Z'$	(g)
19	$Z-PO_2-(OP(E'E')O)_n-PO_2-Z'$	(h)

20 where Z or Z' is a hydrogen atom or a thermally stable substituent comprising primarily one or more
 21 atoms selected from the group carbon, nitrogen, oxygen, sulfur and phosphorus with sufficient
 22 hydrogen atoms to satisfy valence requirements, E and E' are an oxygen atom or a thermally stable
 23 substituent comprising primarily one or more atoms selected from the group carbon, nitrogen,
 24 oxygen, sulfur and phosphorus with sufficient hydrogen atoms to satisfy valence requirements and
 25 n is an integer having a value between 0 and about 5, where the modified nucleotide increases base
 26 incorporation fidelity of the nucleotide polymerizing agent relative to a base incorporation fidelity
 27 of the nucleotide polymerizing agent in the absence of the modified nucleotide to produce an
 28 extended primer having reduced incorrect base incorporations and where the pyrophosphorolysis
 29 inhibits pyrophosphorolysis reduces the amount of pyrophosphorolysis occurring in the reaction.

1 8.(original) The method of claim 7, wherein the modified nucleotide comprises a β and/or γ
 2 phosphate modified nucleotide.

1 9.(original) The method of claim 7, wherein the modified nucleotide comprises a β phosphate
2 modified nucleotide.

1 10.(original) The method of claim 7, wherein the modified nucleotide comprises a γ phosphate
2 modified nucleotide.

1 11.(canceled)

1 12.(previously presented) The method of claim 10, wherein the tag comprises
2 aminonaphthalene-1-sulfonate (ANS).

1 13.(currently amended) A method for using modified nucleotides to alter base incorporation
2 fidelity comprising the step of adding a modified nucleotide including a molecular tag to an assay
3 for extending a nucleotide sequence, and a pyrophosphorolysis inhibitor selected from the group
4 consisting of compounds of the following general formulas and mixtures or combinations thereof:

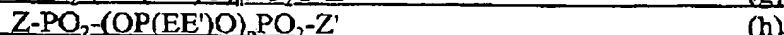
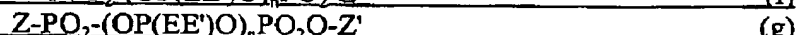
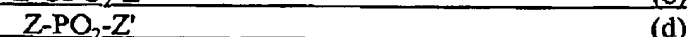
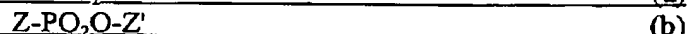
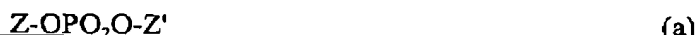
5	$Z-OPO_2O-Z'$	(a)
6	$Z-PO_2O-Z'$	(b)
7	$Z-OPO_2-Z'$	(c)
8	$Z-PO_2-Z'$	(d)
9	$Z-OPO_2-(OP(E'E')O)_n-PO_2O-Z'$	(e)
10	$Z-OPO_2-(OP(E'E')O)_n-PO_2-Z'$	(f)
11	$Z-PO_2-(OP(E'E')O)_n-PO_2O-Z'$	(g)
12	$Z-PO_2-(OP(E'E')O)_n-PO_2-Z'$	(h)

13 where Z or Z' is a hydrogen atom or a thermally stable substituent comprising primarily one or more
14 atoms selected from the group carbon, nitrogen, oxygen, sulfur and phosphorus with sufficient
15 hydrogen atoms to satisfy valence requirements. E and E' are an oxygen atom or a thermally stable
16 substituent comprising primarily one or more atoms selected from the group carbon, nitrogen,
17 oxygen, sulfur and phosphorus with sufficient hydrogen atoms to satisfy valence requirements and
18 n is an integer having a value between 0 and about 5 and where the modified nucleotide alters base
19 incorporation fidelity of a nucleotide polymerizing agent relative to a base incorporation fidelity of
20 the polymerizing agent in the absence of the modified nucleotide, and the assay is selected from the
21 group consisting of genotyping for *in vitro* reproductive methods (human and other organisms);
22 single nucleotide polymorphism (SNP) detection; DNA sequencing; RNA sequencing; single

nucleotide extension assays; amplified DNA product assays; rolling circle product assays; PCR product assays; allele-specific primer extension assays; single-molecule arrays (DNA, RNA, protein) assays; and drug toxicity evaluation assays.

14.(canceled)

15.(currently amended) A kit for performing a nucleotide polymerizing reaction comprising using at least one modified nucleotide including a molecular tag in the presence of a polymerizing agent, a primer, and a template and a pyrophosphorolysis inhibitor selected from the group consisting of compounds of the following general formulas and mixtures or combinations thereof:



where Z or Z' is a hydrogen atom or a thermally stable substituent comprising primarily one or more atoms selected from the group carbon, nitrogen, oxygen, sulfur and phosphorus with sufficient hydrogen atoms to satisfy valence requirements, E and E' are an oxygen atom or a thermally stable substituent comprising primarily one or more atoms selected from the group carbon, nitrogen, oxygen, sulfur and phosphorus with sufficient hydrogen atoms to satisfy valence requirements and n is an integer having a value between 0 and about 5 and; where the modified nucleotide alters polymerizing agent extension fidelity for the at least one modified nucleotide compared to the polymerizing agent extension fidelity in the presence of the unmodified nucleotide corresponding to the at least one modified nucleotide.

16.(canceled)

17.(canceled)

18.(canceled)

19.(canceled)

20.(canceled)

21.(previously presented) The method of claim 7, wherein the tag is-covalently bonded to the modified nucleotide through a linker.

1 22.(previously presented) The method of claim 7, wherein the tag is covalently bonded to the
2 modified nucleotide.

1 23.(previously presented) The method of claim 10, wherein the molecular tag comprises a
2 fluorophore selected from the group consisting of 4-acetamido-4'-isothiocyanatostilbene-
3 2,2'-disulfonic acid; acridine and derivatives: acridine, acridine isothiocyanate; 5- (2'-aminoethyl)
4 aminonaphthalene-1-sulfonic acid (EDANS); 4-amino-3-vinylsulfonyl phenyl] naphthalimide-3,5
5 disulfonate; - (4-anilino-1-naphthyl) maleimide; anthranilamide; BODIPY; Brilliant Yellow;
6 coumarin and derivatives: coumarin, 7-amino-4-methylcoumarin (AMC, Coumarin 120), 7-amino-
7 4-trifluoromethylcoumarin (Coumarin 151); cyanine dyes; cyanosine; 4', 6-diaminidino-
8 2-phenylindole (DAPI); 5', 5''-dibromopyrogallol-sulfonaphthalein (Bromopyrogallol Red); 7-
9 diethylamino-3-(4'-isothiocyanatophenyl)-4-methylcoumarin; diethylenetriamine pentaacetate; 4,4'-
10 diisothiocyanatodihydro-stilbene-2,2'-disulfonic acid; 4,4' diisothiocyanatostilbene-2,2'-disulfonic
11 acid; 5-dimethylamino naphthalene-1-sulfonyl chloride (DNS, dansylchloride); 4-
12 dimethylaminophenylazophenyl-4'-isothiocyanate (DABITC); eosin and derivatives: eosin, eosin
13 isothiocyanate, erythrosin and derivatives: erythrosin B, erythrosin, isothiocyanate; ethidium;
14 fluorescein and derivatives: 5-carboxyfluorescein (FAM), 5- (4, 6-dichlorotriazin-2-yl)
15 amino fluorescein (DTAF), 2', 7'-dimethoxy-4',5'-dichloro-6-carboxyfluorescein (JOE), fluorescein,
16 fluorescein isothiocyanate, QFITC, (XRITC); fluorescamine; IR144; IR1446; Malachite Green
17 isothiocyanate; 4-methylumbelliferone ortho cresolphthalein; nitrotyrosine; pararosaniline; Phenol
18 Red; B-phycoerythrin; o-phthalaldehyde; pyrene and derivatives: pyrene, pyrene butyrate,
19 succinimidyl 1-pyrene; butyrate quantum dots; Reactive Red 4 (Cibacron™ Brilliant Red 3B-A)
20 rhodamine and derivatives: 6-carboxy-X-rhodamine (ROX), 6-carboxyrhodamine (R6G), lissamine
21 rhodamine B sulfonyl chloride rhodamine (Rhod), rhodamine B, rhodamine 123, rhodamine X
22 isothiocyanate, sulforhodamine B, sulforhodamine 101, sulfonyl chloride derivative of
23 sulforhodamine 101 (Texas Red); N, N, N', N'-tetramethyl-6-carboxyrhodamine (TAMRA);
24 tetramethyl rhodamine; tetramethyl rhodamine isothiocyanate (TRITC); riboflavin; rosolic acid;
25 terbium chelate derivatives; Cy 3; Cy 5; Cy 5.5; Cy 7; IRD 700; IRD 800; La Jolla Blue; phthalocyanine;
26 and naphthalocyanine.

24.(previously presented) The method of claim 10, wherein the molecular tag is selected from the group consisting of alkyl groups having between 1 and 30 carbon atoms, aryl groups having between about 6 and about 40 carbon atoms, or alkaryl and aralkyl groups having between about 7 and about 40 carbon atoms, or mixture or combinations thereof, where the carbon atoms are replaced by one or more hetero atoms in the structure provided the structure represents a stable molecular system, where the hetero atoms selected from the group consisting of P, S, Si, N, and O.

25.(previously presented) The method of claim 10, wherein the molecular tag is selected from the group consisting of 4-aminophenol, 6-aminonaphthol, 4-nitrophenol, 6-nitronaphthol, 4-methylphenol, 6-chloronaphthol, 4-methoxyphenol, 6-bromonaphthol, 4-chlorophenol, 6-iodonaphthol, 4-bromophenol, 4, 4'-dihydroxybiphenyl, 4-iodophenol, 8-hydroxyquinoline, 4-nitronaphthol, 3-hydroxypyridine, 4-aminonaphthol, umbelliferone, 4-methylnaphthol, resorufin, 4-methoxynaphthol, 8-hydroxypyrene, 4-chloronaphthol, 9-hydroxyanthracene, 4-bromonaphthol, 6-nitro-9-hydroxyanthracene, 4-iodonaphthol, 3-hydroxyflavone, 6-methylnaphthol, fluorescein, 6-methoxynaphthol, 3-hydroxybenzoflavone, 1-hydroxy-2-propyne, 1-hydroxy-4-pentyne, 1-hydroxy-3-butyne, 1-hydroxy-5-hexyne, Methanol, Ethanol, Propanol, Isopropanol, Butanol, Tert-butanol, Hexanol, Cyclohexanol, Heptanol, Octanol, Decanol, Undecanol, Dodecanol, 1-acetoxymethanol (CH₃OOCH₂-O-NTP), 2-acetoxyethanol, 3-acetoxypropanol, 4-acetoxybutanol, 5-acetoxypentanol, 6-acetoxyhexanol, 2-nitroethanol, 3-nitropropanol, 4-nitrobutanol, 5-nitropentanol, 5-nitrohexanol, 1-hydroxy-3-propene, 1-hydroxy-2-cyclohexene, 1-hydroxy-4-butene, 1-hydroxy-3-propaldehyde, 1-hydroxy-5-pentene, 1-hydroxy-4-butanaldehyde, 1-hydroxy-6-hexene, 1-hydroxy-3-Butanone, Phenol, 4-methyl-3-hydroxypyridine, 4-Carboxyphenol, 5-methoxy-3-hydroxypyridine, 4-Acetoxymethylphenol, 5-nitro-3-hydroxypyridine, 4-nitrophenol, 5-acetoxymethyl-3-hydroxypyridine, 4-methylphenol, 6-methyl-8-hydroxyquinoline, 4-methoxyphenol 6-methoxy-8-hydroxyquinoline, 4-ethylphenol, 4-methyl-8-hydroxyquinoline, 4-butylphenol, 6-nitro-8-hydroxyquinoline, naphthol, 4-acetoxymethyl-8-hydroxyquinoline, 4 or 6 or 8 methylnaphthol pyrene, 4 or 6 or 8 methoxynaphthol, 6-methyl-8-hydroxypyrene, 4 or 6 or 8 nitronaphthol, 6-ethyl-8-hydroxypyrene, 4 or 6 or 8 ethylnaphthol, 6-nitro-8-hydroxypyrene, 4 or 6 or 8 butylnaphthol 6-(carboxysuccinimidylester) fluorescein, 4 or 6 or 8 acetoxymethylnaphthol, 6-carboxymethyl-2, 7-dichlorofluorescein, Methanol Cyclohexanol, 2-carboxy ethanol, 3-carboxypropanol, 4-carboxybutanol, 2-hydroxyethanol, 3-hydroxypropanol, 4-hydroxybutanol, 2-aminoethanol, 2-nitroethanol, 3-aminopropanol, 3-nitropropanol, 4-aminobutanol, and 4-nitrobutanol.

26.(previously presented) The method of claim 10, wherein the modified nucleotide is selected from the group consisting of Adenosine-5'- (γ -ANS) triphosphate, Guanosine-5'- (γ -ANS) triphosphate, Cytosine-5'- (γ -ANS) triphosphate, Thymidine-5'- (γ -ANS) triphosphate, Adenosine-5'- (γ -4-nitrophenyl) triphosphate, Adenosine-5'- (γ -4-iodonaphthyl), Guanosine-5'- (γ -4-nitrophenyl) triphosphate, triphosphate Adenosine-5'- (γ -6-methylnaphthyl) triphosphate, Cytosine-5'- (γ -4-nitrophenyl) triphosphate, Thymidine-5'- (γ -4-nitrophenyl) triphosphate, Adenosine-5'- (γ -6-methoxynaphthyl) triphosphate, Uracil-5'- (γ -4-nitrophenyl) triphosphate, 3'-azido-3'-deoxythymidine-5'-(γ -4-nitrophenyl)triphosphate, Adenosine-5'- (γ -6-aminonaphthyl) triphosphate, 3'-azido-2', 3'-dideoxythymidine-5'- (γ -4- nitrophenyl)triphosphate, Adenosine-5'- (γ -6-nitronaphthyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- (γ -4-nitrophenyl)triphosphate, Adenosine-5'- (γ -6-chloronaphthyl) triphosphate, Adenosine-5'- (γ -4-aminophenyl) triphosphate, Adenosine-5'- (γ -6-bromonaphthyl) triphosphate, Adenosine-5'- (γ -4-methylphenyl) triphosphate, Adenosine-5'- (γ -6-iodonaphthyl) triphosphate, Adenosine-5'- (γ -4-methoxyphenyl) triphosphate, Adenosine-5'-(γ -4'-hydroxybiphenyl) triphosphate, Adenosine-5'- (γ -4-chlorophenyl) triphosphate, Adenosine-5'- (γ -8-quinolyl) triphosphate, Adenosine-5'- (γ -4-bromophenyl) triphosphate, Adenosine-5'- (γ -3-pyridyl) triphosphate, Adenosine-5'- (γ -umbelliferone), Adenosine-5'- (γ -4-iodophenyl) triphosphate, Adenosine-5'- (γ -4-nitronaphthyl) triphosphate, Adenosine-5'- (γ -resorufin) triphosphate, Adenosine-5'- (γ -pyrene) triphosphate, Adenosine-5'- (γ -4-aminonaphthyl) triphosphate, Adenosine-5'- (γ -anthracene) triphosphate, Adenosine-5'-(γ -6-nitroanthracene) triphosphate, Adenosine-5'- (γ -4-methylnaphthyl) triphosphate, Adenosine-5'- (γ -flavonyl) triphosphate, Adenosine-5'-(γ -4-methoxynaphthyl) triphosphate, Adenosine-5'-(γ -fluorescein) triphosphate, Adenosine-5'- (γ -benzoflavone) triphosphate, Adenosine-5'- (γ -4-chloronaphthyl) triphosphate, Adenosine-5'- (γ - (4-nitrophenyl)- γ' - (4-aminophenyl) triphosphate, Adenosine-5'- (γ -4-bromonaphthyl) triphosphate, Adenosine-5'- (γ - (4-nitrophenyl)- γ' - (4-nitronaphthyl) triphosphate, Adenosine-5'- (γ -methyl) triphosphate, Adenosine-5'- (γ -acetoxypentyl)triphosphate, Guanosine-5'- (γ -methyl) triphosphate, Cytosine-5'- (γ -methyl) triphosphate, Adenosine-5'- (γ -acetoxymethyl)triphosphate (CH₃OOCCCH₂-O-NTP), Thymidine-5'- (γ -methyl) triphosphate, Uracil-5'- (γ -methyl) triphosphate, Adenosine-5'-(γ -acetoxylethyl) triphosphate, 3'-azido-3'-deoxythymidine-5'-(γ -methyl)triphosphate, Adenosine-5'- (γ -acetoxypentyl)triphosphate, 3'-azido-2', 3'-dideoxythymidine-5'- (γ -methyl) triphosphate, Adenosine-5'- (γ , acetoxypentyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- (γ -methyl)

triphosphate, Adenosine-5'- (γ - acetoxyhexyl) triphosphate, Adenosine-5'- (γ -ethyl) triphosphate, Adenosine-5'- (γ -2-nitroethyl) triphosphate, Adenosine-5'- (γ -propyl) triphosphate, Adenosine-5'- (γ -4-butyl) triphosphate, Adenosine-5'- (γ -3-nitropropyl) triphosphate, Adenosine-5'- (γ -hexyl) triphosphate, Adenosine-5'- (γ -octyl) triphosphate, Adenosine-5'- (γ -4-nitrobutyl)triphosphate, Adenosine-5'- (γ -decyl) triphosphate, Adenosine-5'- (γ -dodecyl) triphosphate, Adenosine-5'- (γ -5-nitropentyl)triphosphate, Adenosine-5'- (γ -isopropyl) triphosphate, Adenosine-5'- (γ -tert-butyl) triphosphate, Adenosine-5'- (γ -methyl)- (γ' -ethyl) triphosphate, Adenosine-5'- (γ -cyclohexyl) triphosphate, Adenosine-5'- (γ -methyl)- (γ' -propyl) triphosphate, Adenosine-5'- (γ -2-propenyl) triphosphate, Adenosine-5'- (γ -3-butenyl) triphosphate, Guanosine-5'- (γ -2-propenyl) triphosphate, Adenosine-5'- (γ -4-pentenyl) triphosphate, Cytosine-5'- (γ -2-propenyl) triphosphate, Adenosine-5'- (γ -5-hexenyl) triphosphate, Thymidine-5'- (γ -2-propenyl) triphosphate, Adenosine-5'- (γ -cyclohexenyl) triphosphate, Uracil-5'- (γ -2-propenyl) triphosphate, Adenosine-5'- (γ -3-propanaldehyde) triphosphate, 3'-azido-3'-deoxythymidine-5'- (γ -2-propenyl) triphosphate, Adenosine-5'- (γ -4-butanaldehyde) triphosphate, 3'-azido-2',3'-dideoxythymidine-5'- (γ -2-propenyl) triphosphate, Adenosine-5'- (γ -3-butanone) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- (γ -2-propenyl) triphosphate, Adenosine-5'- (γ -2-propynyl) triphosphate, 3'-azido-2', 3'-dideoxythymidine-5'- (γ -2-propynyl) triphosphate, Guanosine-5'- (γ -2-propynyl) triphosphate, Cytosine-5'- (γ -2-propynyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- (γ -2-propynyl) triphosphate Thymidine 5'- (γ -2-propynyl) triphosphate, Uracil-5'- (γ -2-propynyl) triphosphate, Adenosine-5'- (γ -3-butyryl) triphosphate, 3'-azido-3'-deoxythymidine-5'- (γ -2-propynyl) triphosphate, Adenosine-5'- (γ -4-pentyryl) triphosphate, Adenosine-5'- (γ -5-pentyryl) triphosphate, Adenosine-5'- (γ -4-phenyl) triphosphate, Adenosine-5'- (γ - (4 or 6 or 8 acetoxymethyl naphthyl) triphosphate, Guanosine-5'- (γ -4-phenyl) triphosphate, Cytosine-5'- (γ -4-phenyl) triphosphate, Adenosine-5'- (γ - (4-methylpyridyl) triphosphate, Thymidine-5'- (γ -4-phenyl) triphosphate, Uracil-5'- (γ -4-phenyl) triphosphate, Adenosine-5'- (γ - (5-methoxypyridyl) triphosphate, 3'-azido-3'-deoxythymidine-5'- (γ -4-phenyl) triphosphate, Adenosine-5'- (γ - (5-nitropyridyl) triphosphate, 3'-azido-2',3'-dideoxythymidine-5'- (γ -4-phenyl) triphosphate, Adenosine-5'- (γ - (5-acetoxymethylpyridyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- (γ -4-phenyl) triphosphate, Adenosine-5'- (γ - (6-methyl-1-quinolyl) triphosphate, Adenosine-5'- (γ -4-carboxyphenyl) triphosphate, Adenosine-5'- (γ - (6-methoxy-1-quinolyl) triphosphate, Adenosine-5'- (γ - (4-acetoxymethyl) phenyl) triphosphate, Adenosine-5'- (γ - (4-methyl-1-quinolyl) triphosphate, Adenosine-5'- (γ -4-nitrophenyl) triphosphate, Adenosine-5'- (γ -4-

64 methylphenyl)triphosphate, Adenosine-5'-(γ -(6-nitro-1-quinolyl) triphosphate, Adenosine-5'-(γ -4-
65 methoxyphenyl) triphosphate, Adenosine-5'-(γ -(4-acetoxymethylpyrenyl) triphosphate, Adenosine-
66 5'-(γ -4-ethylphenyl) triphosphate, Adenosine-5'-(γ -(6-methylpyrenyl) triphosphate, Adenosine-5'-
67 (γ -4-butylphenyl) triphosphate, Adenosine 5'-(γ -naphthyl) triphosphate, Adenosine-5'-(γ -(6-
68 ethylpyrenyl) triphosphate, Adenosine-5'-(γ -(4 or 6 or 8 methyl naphthyl)triphosphate, Adenosine-
69 5'-(γ -(6-nitropyrenyl) triphosphate, Adenosine-5'-(γ -(4 or 6 or 8 methoxynaphthyl) triphosphate,
70 Adenosine-5'-(γ -6-(carboxysuccinimidyl fluorescein) triphosphate, Adenosine-5'-(γ -(4 or 6 or
71 8 nitro naphthyl) triphosphate. Adenosine-5'-(γ -6-carboxymethyl-2, 7-dichlorofluorescein)
72 triphosphate, Adenosine-5'-(γ -(4 or 6 or 8 ethyl naphthyl) triphosphate, Adenosine-5'-(γ -4-
73 phenyl)-(γ -4 nitrophenyl) triphosphate, Adenosine-5'-(γ -(4 or 6 or 8 butyl naphthyl)triphosphate,
74 Adenosine-5'-(γ -4-phenyl)-(γ -4 aminophenyl)triphosphate, Adenosine-5'-(γ -methyl) triphosphate,
75 Adenosine-5'-(γ -3-aminopropyl) triphosphate, Guanosine-5'-(γ -methyl) triphosphate, Adenosine-
76 5'-(γ -4-aminobutyl) triphosphate, Cytosine-5'-(γ -methyl) triphosphate Adenosine-5'-(γ -
77 cyclohexyl) triphosphate, Thymidine-5'-(γ -methyl) triphosphate Adenosine-5'-(γ -2-carboxyethyl)
78 triphosphate, Uracil-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ -3-carboxypropyl)triphosphate,
79 3'-azido-3'-deoxythymidine-5'-(7-methyl) triphosphate, Adenosine-5'-(γ -4-carboxybutyl)
80 triphosphate, 3'-azido-2',3'-dideoxythymidine-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ -2-
81 hydroxyethyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'-(γ -methyl)triphosphate,
82 Adenosine-5'-(γ -3-hydroxypropyl) triphosphate, Adenosine-5'-(γ -ethyl) triphosphate, Adenosine-
83 5'-(γ -propyl) triphosphate, Adenosine-5'-(γ -4-hydroxybutyl) triphosphate, Adenosine-5'-(γ -4-
84 butyl) triphosphate, Adenosine-5'-(γ -2-nitroethyl) triphosphate, Adenosine-5'-(γ -hexyl)
85 triphosphate, Adenosine-5'-(γ -3-nitropropyl) triphosphate, Adenosine-5'-(γ -isopropyl)
86 triphosphate, Adenosine-5'-(γ -4-nitrobutyl) triphosphate, Adenosine-5'-(γ -tert-butyl) triphosphate
87 ,Adenosine-5'-(γ -methyl)-(γ -ethyl)triphosphate, Adenosine-5'-(γ -cyclohexyl) triphosphate,
88 Adenosine-5'-(γ -2-aminoethyl)triphosphate, and Adenosine-5'-(γ -methyl)-(γ -propyl)
89 triphosphate.

1 27.(previously presented) The method of claim 13, wherein the tag is covalently bonded to the
2 modified nucleotide through a linker.

1 28.(previously presented) The method of claim 13, wherein the tag is covalently bonded to the
2 modified nucleotide.

1 29.(previously presented) The method of claim 13, wherein the modified nucleotide comprises
2 a β and/or γ phosphate modified nucleotide.

1 30.(previously presented) The method of claim 13, wherein the modified nucleotide comprises
2 a β phosphate modified nucleotide.

1 31.(previously presented) The method of claim 13, wherein the modified nucleotide comprises
2 a γ phosphate modified nucleotide.

32.(canceled)

33.(canceled)

34.(canceled)

1 35.(previously presented) The method of claim 31, wherein the modified nucleotide is selected
2 from the group consisting of Adenosine-5'- (γ -ANS) triphosphate, Guanosine-5'- (γ -ANS)
3 triphosphate, Cytosine-5'- (γ -ANS) triphosphate, Thymidine-5'- (γ -ANS) triphosphate, Adenosine-
4 5'- (γ -4-nitrophenyl) triphosphate, Adenosine-5'- (γ -4-iodonaphthyl), Guanosine-5'- (γ -4-
5 nitrophenyl) triphosphate, triphosphate Adenosine-5'- (γ -6-methylnaphthyl) triphosphate, Cytosine-
6 5'- (γ -4-nitrophenyl) triphosphate, Thymidine-5'- (γ -4-nitrophenyl) triphosphate, Adenosine-5'- (γ -
7 6-methoxynaphthyl) triphosphate, Uracil-5'- (γ -4-nitrophenyl) triphosphate, 3'-azido-3'-
8 deoxythymidine-5'- (γ -4-nitrophenyl) triphosphate, Adenosine-5'- (γ -6-aminonaphthyl) triphosphate,
9 3'-azido-2', 3'-dideoxythymidine-5'- (γ -4- nitrophenyl) triphosphate, Adenosine-5'- (γ -6-
10 nitronaphthyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'- (γ -4-
11 nitrophenyl) triphosphate, Adenosine-5'- (γ -6-chloronaphthyl) triphosphate, Adenosine-5'- (γ -4-
12 aminophenyl) triphosphate, Adenosine-5'- (γ -6-bromonaphthyl) triphosphate, Adenosine-5'- (γ -4-
13 methylphenyl) triphosphate, Adenosine-5'- (γ -6-iodonaphthyl) triphosphate, Adenosine-5'- (γ -4-
14 methoxyphenyl) triphosphate, Adenosine-5'- (γ -4'-hydroxybiphenyl) triphosphate, Adenosine-5'- (γ -
15 4-chlorophenyl) triphosphate, Adenosine-5'- (γ -8-quinolyl) triphosphate, Adenosine-5'- (γ -4-
16 bromophenyl) triphosphate, Adenosine-5'- (γ -3-pyridyl) triphosphate, Adenosine-5'- (γ -
17 umbelliferone), Adenosine-5'- (γ -4-iodophenyl) triphosphate, Adenosine-5'- (γ -4-nitronaphthyl)
18 triphosphate, Adenosine-5'- (γ -resorufin) triphosphate, Adenosine-5'- (γ -pyrene) triphosphate,
19 Adenosine-5'- (γ -4-aminonaphthyl) triphosphate, Adenosine-5'- (γ -anthracene) triphosphate,

Adenosine-5'-(Γ -6-nitroanthracene) triphosphate, Adenosine-5'-(γ -4-methylnaphthyl) triphosphate, Adenosine-5'-(γ -flavonyl) triphosphate, Adenosine-5'-(γ -4-methoxynaphthyl) triphosphate, Adenosine-5'-(γ -fluorescein) triphosphate, Adenosine-5'-(γ -benzoflavone) triphosphate, Adenosine-5'-(γ -4-chloronaphthyl) triphosphate, Adenosine-5'-(γ -(4-nitrophenyl)- γ' -(4-aminophenyl) triphosphate, Adenosine-5'-(γ -4-bromonaphthyl) triphosphate, Adenosine-5'-(γ -(4-nitrophenyl)- γ' -(4-nitronaphthyl) triphosphate, Adenosine-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ -acetoxypentyl) triphosphate, Guanosine-5'-(γ -methyl) triphosphate, Cytosine-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ -acetoxymethyl) triphosphate (CH₃OOCCCH₂-O-NTP), Thymidine-5'-(γ -methyl) triphosphate, Uracil-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ -acetoxylethyl) triphosphate, 3'-azido-3'-deoxythymidine-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ -acetoxypentyl) triphosphate, 3'-azido-2',3'-dideoxythymidine-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ , acetoxypentyl) triphosphate, 2',3'-didehydro-2',3'-dideoxythymidine-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ -acetoxylhexyl) triphosphate, Adenosine-5'-(γ -ethyl) triphosphate, Adenosine-5'-(γ -2-nitroethyl) triphosphate, Adenosine-5'-(γ -propyl) triphosphate, Adenosine-5'-(γ -4-butyl) triphosphate, Adenosine-5'-(γ -3-nitropropyl) triphosphate, Adenosine-5'-(γ -hexyl) triphosphate, Adenosine-5'-(γ -octyl) triphosphate, Adenosine-5'-(γ -4-nitrobutyl) triphosphate, Adenosine-5'-(γ -decyl) triphosphate, Adenosine-5'-(γ -dodecyl) triphosphate, Adenosine-5'-(γ -5-nitropentyl) triphosphate, Adenosine-5'-(γ -isopropyl) triphosphate, Adenosine-5'-(γ -tert-butyl) triphosphate, Adenosine-5'-(γ -methyl)-(γ' -ethyl) triphosphate, Adenosine-5'-(γ -cyclohexyl) triphosphate, Adenosine-5'-(γ -methyl)-(γ' -propyl) triphosphate, Adenosine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -3-butenyl) triphosphate, Guanosine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -4-pentenyl) triphosphate, Cytosine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -5-hexenyl) triphosphate, Thymidine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -cyclohexenyl) triphosphate, Uracil-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -3-propanaldehyde) triphosphate, 3'-azido-3'-deoxythymidine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -4-butanaldehyde) triphosphate, 3'-azido-2',3'-dideoxythymidine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -3-butanone) triphosphate, 2',3'-didehydro-2',3'-dideoxythymidine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -2-propynyl) triphosphate, 3'-azido-2',3'-dideoxythymidine-5'-(γ -2-propynyl) triphosphate, Guanosine-5'-(γ -2-propynyl) triphosphate, Cytosine-5'-(γ -2-propynyl) triphosphate, 2',3'-didehydro-2',3'-dideoxythymidine-5'-(γ -2-propynyl) triphosphate, Thymidine 5'-(γ -2-propynyl) triphosphate, Uracil-5'-(γ -2-propynyl) triphosphate, Adenosine-5'-(γ -3-butyryl) triphosphate, 3'-azido-3'-deoxythymidine-5'-(γ -2-

84 butyl) triphosphate, Adenosine-5'- (γ -2-nitroethyl) triphosphate, Adenosine-5'- (γ -hexyl)
85 triphosphate, Adenosine-5'- (γ -3-nitropropyl) triphosphate, Adenosine-5'- (γ -isopropyl)
86 triphosphate, Adenosine-5'- (γ -4-nitrobutyl) triphosphate, Adenosine-5'- (γ -tert-butyl) triphosphate
87 ,Adenosine-5'- (γ -methyl)- (γ' -ethyl) triphosphate, Adenosine-5'- (γ -cyclohexyl) triphosphate,
88 Adenosine-5'- (γ -2-aminoethyl) triphosphate, and Adenosine-5'- (γ -methyl)- (γ' -propyl)
89 triphosphate.

1 36.(previously presented) The method of claim 7, wherein the polymerizing agent is selected
2 from the group consisting of naturally occurring or synthetic polymerases and reverse transcriptases.

1 37.(previously presented) The method of claim 13, wherein the polymerizing agent is selected
2 from the group consisting of naturally occurring or synthetic polymerases and reverse transcriptases.

1 38.(previously presented) The kit of claim 15, wherein the tag is covalently bonded to the
2 modified nucleotide through a linker.

1 39.(previously presented) The kit of claim 15, wherein the tag is covalently bonded to the
2 modified nucleotide.

1 40.(previously presented) The kit of claim 15, wherein the modified nucleotide comprises a β
2 and/or γ phosphate modified nucleotide.

1 41.(previously presented) The kit of claim 15, wherein the modified nucleotide comprises a β
2 phosphate modified nucleotide.

1 42.(previously presented) The kit of claim 15, wherein the modified nucleotide comprises a γ
2 phosphate modified nucleotide.

1 43.(previously presented) The kit of claim 39, wherein the molecular tag comprises a
2 fluorophore selected from the group consisting of 4-acetamido-4'-isothiocyanatostilbene-
3 2,2'-disulfonic acid; acridine and derivatives: acridine, acridine isothiocyanate; 5- (2'-aminoethyl)
4 aminonaphthalene-1-sulfonic acid (EDANS); 4-amino - 3-vinylsulfonyl phenyl] naphthalimide-3,5

disulfonate; - (4-aminonaphthyl) maleimide; anthranilamide; BODIPY; Brilliant Yellow; coumarin and derivatives: coumarin, 7-amino-4-methylcoumarin (AMC, Coumarin 120), 7-amino-4-trifluoromethylcoumarin (Coumarin 151); cyanine dyes; cyanosine; 4', 6-diaminidino-2-phenylindole (DAPI); 5', 5''-dibromopyrogallol-sulfonaphthalein (Bromopyrogallol Red); 7-diethylamino-3-(4'-isothiocyanatophenyl)-4-methylcoumarin; diethylenetriamine pentaacetate; 4,4'-diisothiocyanatodihydro-stilbene-2,2'-disulfonic acid; 4,4' diisothiocyanatostilbene-2,2'-disulfonic acid; 5-dimethylamino naphthalene-1-sulfonyl chloride (DNS, dansylchloride); 4-dimethylaminophenylazophenyl-4'-isothiocyanate (DABITC); eosin and derivatives: eosin, eosin isothiocyanate, erythrosin and derivatives: erythrosin B, erythrosin, isothiocyanate; ethidium; fluorescein and derivatives: 5-carboxyfluorescein (FAM), 5- (4, 6-dichlorotriazin-2-yl) aminofluorescein (DTAF), 2', 7'-dimethoxy-4',5'-dichloro-6-carboxyfluorescein (JOE), fluorescein, fluorescein isothiocyanate, QFITC, (XRITC); fluorescamine; IR144; IR1446; Malachite Green isothiocyanate; 4-methylumbelliferoneortho cresolphthalein; nitrotyrosine; pararosaniline; Phenol Red; B-phycoerythrin; o-phthaldialdehyde; pyrene and derivatives: pyrene, pyrene butyrate, succinimidyl 1-pyrene; butyrate quantum dots; Reactive Red 4 (Cibacron™ Brilliant Red 3B-A) rhodamine and derivatives: 6-carboxy-X-rhodamine (ROX), 6-carboxyrhodamine (R6G), lissamine rhodamine B sulfonyl chloride rhodamine (Rhod), rhodamine B, rhodamine 123, rhodamine X isothiocyanate, sulforhodamine B, sulforhodamine 101, sulfonyl chloride derivative of sulforhodamine 101 (Texas Red); N, N, N', N'-tetramethyl-6-carboxyrhodamine (TAMRA); tetramethyl rhodamine; tetramethyl rhodamine isothiocyanate (TRITC); riboflavin; rosolic acid; terbium chelate derivatives; Cy 3; Cy 5; Cy 5.5; Cy 7; IRD 700; IRD 800; La Jolla Blue; phthalocyanine; and naphthalo cyanine.

44.(previously presented) The kit of claim 39, wherein the molecular tag is selected from the group consisting of alkyl groups having between 1 and 30 carbon atoms, aryl groups having between about 6 and about 40 carbon atoms, or alkaryl and aralkyl groups having between about 7 and about 40 carbon atoms, or mixture or combinations thereof, where the carbon atoms are replaced by one or more hetero atoms in the structure provided the structure represents a stable molecular system, where the hetero atoms selected from the group consisting of P, S, Si, N, and O.

45.(previously presented) The kit of claim 39, wherein the molecular tag is selected from the group consisting of 4-aminophenol, 6-aminonaphthol, 4-nitrophenol, 6-nitronaphthol, 4-

3 methylphenol, 6-chloronaphthol, 4-methoxyphenol, 6-bromonaphthol, 4-chlorophenol, 6-
4 iodonaphthol, 4-bromophenol, 4, 4'-dihydroxybiphenyl, 4-iodophenol, 8-hydroxyquinoline, 4-
5 nitronaphthol, 3-hydroxypyridine, 4-aminonaphthol, umbelliferone, 4-methylnaphthol, resorufin,
6 4-methoxynaphthol, 8-hydroxypyrene, 4-chloronaphthol, 9-hydroxyanthracene, 4-bromonaphthol,
7 6-nitro-9-hydroxyanthracene, 4-iodonaphthol, 3-hydroxyflavone, 6-methylnaphthol, fluorescein, 6-
8 methoxynaphthol, 3-hydroxybenzoflavone, 1-hydroxy-2-propyne, 1-hydroxy-4-pentyne, 1-hydroxy-
9 3-butyne, 1-hydroxy-5-hexyne, Methanol, Ethanol, Propanol, Isopropanol, Butanol, Tert-butanol,
10 Hexanol, Cyclohexanol, Heptanol, Octanol, Decanol, Undecanol, Dodecanol, 1-acetoxymethanol
11 (CH₃OCCH₂-O-NTP), 2-acetoxyethanol, 3-acetoxypropanol, 4-acetoxybutanol, 5-
12 acetoxypentanol, 6-acetoxyhexanol, 2-nitroethanol, 3-nitropropanol, 4-nitrobutanol, 5-nitropentanol,
13 5-nitrohexanol, 1-hydroxy-3-propene, 1-hydroxy-2-cyclohexene, 1-hydroxy-4-butene, 1-hydroxy-3-
14 propaldehyde, 1-hydroxy-5-pentene, 1-hydroxy-4-butanaldehyde, 1-hydroxy-6-hexene, 1-hydroxy-
15 3-Butanone, Phenol, 4-methyl-3-hydroxypyridine, 4-Carboxyphenol, 5-methoxy-3-hydroxypyridine,
16 4-Acetoxymethylphenol, 5-nitro-3-hydroxypyridine, 4-nitrophenol, 5-acetoxymethyl-3-
17 hydroxypyridine, 4-methylphenol, 6-methyl-8-hydroxyquinoline, 4-methoxyphenol 6-methoxy-8-
18 hydroxyquinoline, 4-ethylphenol, 4-methyl-8-hydroxyquinoline, 4-butylphenol, 6-nitro-8-
19 hydroxyquinoline, naphthol, 4-acetoxymethyl-8-hydroxyquinoline, 4 or 6 or 8 methylnaphthol
20 pyrene, 4 or 6 or 8 methoxynaphthol, 6-methyl-8-hydroxypyrene, 4 or 6 or 8 nitronaphthol, 6-ethyl-
21 8-hydroxypyrene, 4 or 6 or 8 ethylnaphthol, 6-nitro-8-hydroxypyrene, 4 or 6 or 8 butylnaphthol 6-
22 (carboxysuccinimidylester) fluorescein, 4 or 6 or 8 acetoxymethylnaphthol, 6-carboxymethyl-2, 7-
23 dichlorofluorescein, Methanol Cyclohexanol, 2-carboxy ethanol, 3-carboxypropanol, 4-
24 carboxybutanol, 2-hydroxyethanol, 3-hydroxypropanol, 4-hydroxybutanol, 2-aminoethanol, 2-
25 nitroethanol, 3-aminopropanol, 3-nitropropanol, 4-aminobutanol, and 4-nitrobutanol.

1 46.(previously presented) The kit of claim 42, wherein the modified nucleotide is selected from
2 the group consisting of Adenosine-5'-(γ -ANS) triphosphate, Guanosine-5'-(γ -ANS) triphosphate,
3 Cytosine-5'-(γ -ANS) triphosphate, Thymidine-5'-(γ -ANS) triphosphate, Adenosine-5'-(γ -4-
4 nitrophenyl) triphosphate, Adenosine-5'-(γ -4-iodonaphthyl), Guanosine-5'-(γ -4-nitrophenyl)
5 triphosphate, triphosphate Adenosine-5'-(γ -6-methylnaphthyl) triphosphate, Cytosine-5'-(γ -4-
6 nitrophenyl) triphosphate, Thymidine-5'-(γ -4-nitrophenyl) triphosphate, Adenosine-5'-(γ -6-
7 methoxynaphthyl) triphosphate, Uracil-5'-(γ -4-nitrophenyl) triphosphate, 3'-azido-3'-
8 deoxythymidine-5'-(γ -4-nitrophenyl)triphosphate, Adenosine-5'-(γ -6-aminonaphthyl) triphosphate,

3'-azido-2', 3'-dideoxythymidine-5'-(γ -4-nitrophenyl)triphosphate, Adenosine-5'-(γ -6-nitronaphthyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'-(γ -4-nitrophenyl)triphosphate, Adenosine-5'-(γ -6-chloronaphthyl) triphosphate, Adenosine-5'-(γ -4-aminophenyl) triphosphate, Adenosine-5'-(γ -6-bromonaphthyl) triphosphate, Adenosine-5'-(γ -4-methylphenyl) triphosphate, Adenosine-5'-(γ -6-iodonaphthyl) triphosphate, Adenosine-5'-(γ -4-methoxyphenyl) triphosphate, Adenosine-5'-(γ -4'-hydroxybiphenyl) triphosphate, Adenosine-5'-(γ -4-chlorophenyl) triphosphate, Adenosine-5'-(γ -8-quinolyl) triphosphate, Adenosine-5'-(γ -4-bromophenyl) triphosphate, Adenosine-5'-(γ -3-pyridyl) triphosphate, Adenosine-5'-(γ -umbelliferone), Adenosine-5'-(γ -4-iodophenyl) triphosphate, Adenosine-5'-(γ -4-nitronaphthyl) triphosphate, Adenosine-5'-(γ -resorufin) triphosphate, Adenosine-5'-(γ -pyrene) triphosphate, Adenosine-5'-(γ -4-aminonaphthyl) triphosphate, Adenosine-5'-(γ -anthracene) triphosphate, Adenosine-5'-(γ -6-nitroanthracene) triphosphate, Adenosine-5'-(γ -4-methylnaphthyl) triphosphate, Adenosine-5'-(γ -flavonyl) triphosphate, Adenosine-5'-(γ -4-methoxynaphthyl) triphosphate, Adenosine-5'-(γ -fluorescein) triphosphate, Adenosine-5'-(γ -benzoflavone) triphosphate, Adenosine-5'-(γ -4-chloronaphthyl) triphosphate, Adenosine-5'-(γ -(4-nitrophenyl)- γ' -(4-aminophenyl) triphosphate, Adenosine-5'-(γ -4-bromonaphthyl) triphosphate, Adenosine-5'-(γ -(4-nitrophenyl)- γ' -(4-nitronaphthyl) triphosphate, Adenosine-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ -acetoxypentyl) triphosphate, Guanosine-5'-(γ -methyl) triphosphate, Cytosine-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ -acetoxymethyl) triphosphate (CH₃OOCC₂H₅-O-NTP), Thymidine-5'-(γ -methyl) triphosphate, Uracil-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ -acetoxylethyl) triphosphate, 3'-azido-3'-deoxythymidine-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ -acetoxypentyl) triphosphate, 3'-azido-2', 3'-dideoxythymidine-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ , acetoxypentyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'-(γ -methyl) triphosphate, Adenosine-5'-(γ -acetoxylhexyl) triphosphate, Adenosine-5'-(γ -ethyl) triphosphate, Adenosine-5'-(γ -2-nitroethyl) triphosphate, Adenosine-5'-(γ -propyl) triphosphate, Adenosine-5'-(γ -4-butyl) triphosphate, Adenosine-5'-(γ -3-nitropropyl) triphosphate, Adenosine-5'-(γ -hexyl) triphosphate, Adenosine-5'-(γ -octyl) triphosphate, Adenosine-5'-(γ -4-nitrobutyl) triphosphate, Adenosine-5'-(γ -decyl) triphosphate, Adenosine-5'-(γ -dodecyl) triphosphate, Adenosine-5'-(γ -5-nitropentyl) triphosphate, Adenosine-5'-(γ -isopropyl) triphosphate, Adenosine-5'-(γ -tert-butyl) triphosphate, Adenosine-5'-(γ -methyl)-(γ' -ethyl) triphosphate, Adenosine-5'-(γ -cyclohexyl) triphosphate, Adenosine-5'-(γ -methyl)-(γ' -propyl) triphosphate, Adenosine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -3-butenyl) triphosphate, Guanosine-5'-(γ -2-propenyl) triphosphate,

Adenosine-5'-(γ -4-pentenyl) triphosphate, Cytosine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -5-hexenyl) triphosphate, Thymidine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -cyclohexenyl) triphosphate, Uracil-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -3-propanaldehyde) triphosphate, 3'-azido-3'-deoxythymidine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -4-butanaldehyde) triphosphate, 3'-azido-2',3'-dideoxythymidine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -3-butanone) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'-(γ -2-propenyl) triphosphate, Adenosine-5'-(γ -2-propynyl) triphosphate, 3'-azido-2', 3'-dideoxythymidine-5'-(γ -2-propynyl) triphosphate, Guanosine-5'-(γ -2-propynyl) triphosphate, Cytosine-5'-(γ -2-propynyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'-(γ -2-propynyl) triphosphate, Thymidine 5'-(γ -2-propynyl) triphosphate, Uracil-5'-(γ -2-propynyl) triphosphate, Adenosine-5'-(γ -3-butynyl) triphosphate, 3'-azido-3'-deoxythymidine-5'-(γ -2-propynyl) triphosphate, Adenosine-5'-(γ -4-pentynyl) triphosphate, Adenosine-5'-(γ -5-pentynyl) triphosphate, Adenosine-5'-(γ -4-phenyl) triphosphate, Adenosine-5'-(γ -(4 or 6 or 8 acetoxymethyl naphthyl) triphosphate, Guanosine-5'-(γ -4-phenyl) triphosphate, Cytosine-5'-(γ -4-phenyl) triphosphate, Adenosine-5'-(γ -(4-methylpyridyl) triphosphate, Thymidine-5'-(γ -4-phenyl) triphosphate, Uracil-5'-(γ -4-phenyl) triphosphate, Adenosine-5'-(γ -(5-methoxypyridyl) triphosphate, 3'-azido-3'-deoxythymidine-5'-(γ -4-phenyl) triphosphate, Adenosine-5'-(γ -(5-nitropyridyl) triphosphate, 3'-azido-2',3'-dideoxythymidine-5'-(γ -4-phenyl) triphosphate, Adenosine-5'-(γ -(5-acetoxymethylpyridyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'-(γ -4-phenyl) triphosphate, Adenosine-5'-(γ -(6-methyl-1-quinolyl) triphosphate, Adenosine-5'-(γ -4-carboxyphenyl) triphosphate, Adenosine-5'-(γ -(6-methoxy-1-quinolyl) triphosphate, Adenosine-5'-(γ -(4-acetoxymethyl) phenyl) triphosphate, Adenosine-5'-(γ -(4-methyl-1-quinolyl) triphosphate, Adenosine-5'-(γ -4-nitrophenyl) triphosphate, Adenosine-5'-(γ -4-methylphenyl) triphosphate, Adenosine-5'-(γ -(6-nitro-1-quinolyl) triphosphate, Adenosine-5'-(γ -4-methoxyphenyl) triphosphate, Adenosine-5'-(γ -(4-acetoxymethylpyrenyl) triphosphate, Adenosine-5'-(γ -4-ethylphenyl) triphosphate, Adenosine-5'-(γ -(6-methylpyrenyl) triphosphate, Adenosine-5'-(γ -4-butylphenyl) triphosphate, Adenosine 5'-(γ -naphthyl) triphosphate, Adenosine-5'-(γ -(6-ethylpyrenyl) triphosphate, Adenosine-5'-(γ -(4 or 6 or 8 methyl naphthyl) triphosphate, Adenosine-5'-(γ -(6-nitropyrenyl) triphosphate, Adenosine-5'-(γ -(4 or 6 or 8 methoxynaphthyl) triphosphate, Adenosine-5'-(γ -6-(carboxysuccinimidyl fluorescein) triphosphate, Adenosine-5'-(γ -(4 or 6 or 8 nitro naphthyl) triphosphate. Adenosine-5'-(γ -6-carboxymethyl-2, 7-dichlorofluorescein) triphosphate, Adenosine-5'-(γ -(4 or 6 or 8 ethyl naphthyl) triphosphate, Adenosine-5'-(γ -4-

phenyl)- (γ -4 nitrophenyl) triphosphate, Adenosine-5'- (γ - (4 or 6 or 8 butyl naphthyl)triphosphate, Adenosine-5'- (γ -4-phenyl)- (γ -4 aminophenyl)triphosphate, Adenosine-5'- (γ -methyl) triphosphate, Adenosine-5'- (γ -3-aminopropyl) triphosphate, Guanosine-5'- (γ -methyl) triphosphate, Adenosine-5'- (γ -4-aminobutyl) triphosphate, Cytosine-5'- (γ -methyl) triphosphate Adenosine-5'- (γ -cyclohexyl) triphosphate, Thymidine-5'- (γ -methyl) triphosphate Adenosine-5'- (γ -2-carboxyethyl) triphosphate, Uracil-5'- (γ -methyl) triphosphate, Adenosine-5'- (γ -3-carboxypropyl)triphosphate, 3'-azido-3'-deoxythymidine-5'- (7-methyl) triphosphate, Adenosine-5'- (γ -4-carboxybutyl) triphosphate, 3'-azido-2',3'-dideoxythymidine-5'- (γ -methyl) triphosphate, Adenosine-5'- (γ -2-hydroxyethyl) triphosphate, 2', 3'-didehydro-2', 3'-dideoxythymidine-5'-(γ -methyl)triphosphate, Adenosine-5'- (γ -3-hydroxypropyl) triphosphate, Adenosine-5'- (γ -ethyl) triphosphate, Adenosine-5'- (γ -propyl) triphosphate, Adenosine-5'- (γ -4-hydroxybutyl) triphosphate, Adenosine-5'- (γ -4-butyl) triphosphate, Adenosine-5'- (γ -2-nitroethyl) triphosphate, Adenosine-5'- (γ -hexyl) triphosphate, Adenosine-5'- (γ -3-nitropropyl) triphosphate, Adenosine-5'- (γ -isopropyl) triphosphate, Adenosine-5'- (γ -4-nitrobutyl) triphosphate, Adenosine-5'- (γ -tert-butyl) triphosphate, Adenosine-5'- (γ -methyl)- (γ -ethyl)triphosphate, Adenosine-5'- (γ -cyclohexyl) triphosphate, Adenosine-5'- (γ -2-aminoethyl)triphosphate, and Adenosine-5'- (γ -methyl)- (γ -propyl) triphosphate.

47.(previously presented) The kit of claim 15, wherein the polymerizing agent is selected from the group consisting of naturally occurring or synthetic polymerases and reverse transcriptases.